Computer Basics

MotherBoard Components

- **Chipsets**
- **BIOS chip**
- **CMOS Memory**

MotherBoard Components

Chipsets

- A chipset is a collection of chips or circuits that perform interface and peripheral functions for the processor
- This collection of chips is usually the circuitry that provides interfaces for memory, expansion cards, and onboard peripherals.
- Generally dictates how a motherboard will communicate with the installed peripherals

MotherBoard Components

Chipsets

- The functions of chipsets can be divided into two major functional groups, called Northbridge and Southbridge.
- The computer chips make up the chipset control communication from the CPU to each of the hardware devices in the system.
- This circuitry is the controller for that specific piece of hardware.
- For example, access to memory is controlled by the memory controller, the hard disk is managed by the hard disk controller, and the keyboard is managed by the keyboard controller.

MotherBoard Components

Chipsets

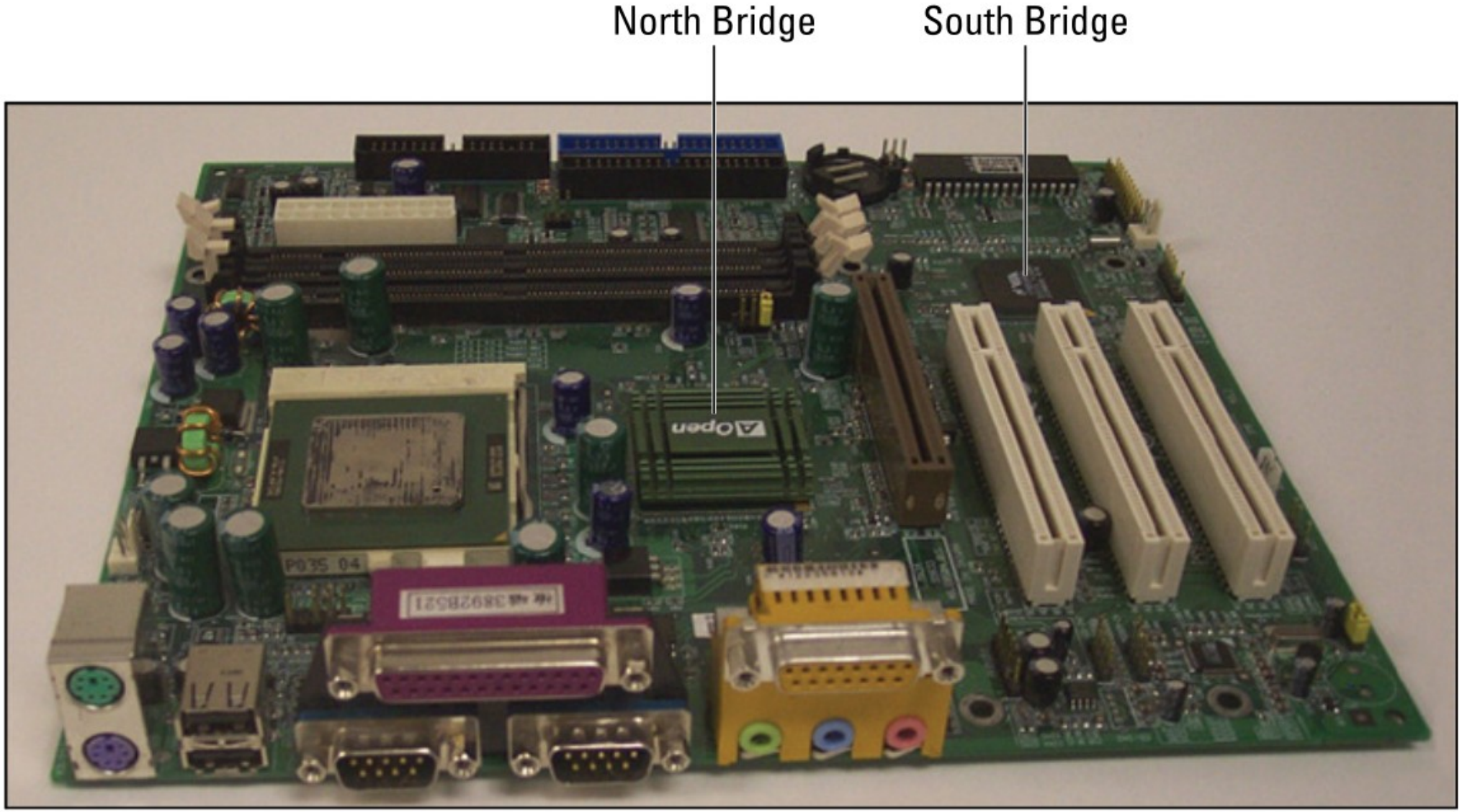
- **Northbridge:**
  - Is the set of circuitry or chips that performs one very important function: management of high-speed peripheral communications.
  - Is responsible for communication from the CPU to memory, the CPU to the PCI Express bus and the Advanced Graphics Port
  - The North Bridge chip is typically the second largest chip (after the processor)
  - typically contains a heat sink or a fan on top of the chip to keep it cool.
  - The North Bridge chip is typically located around the processor, and on older motherboards it is found between the processor and theAGP slot.

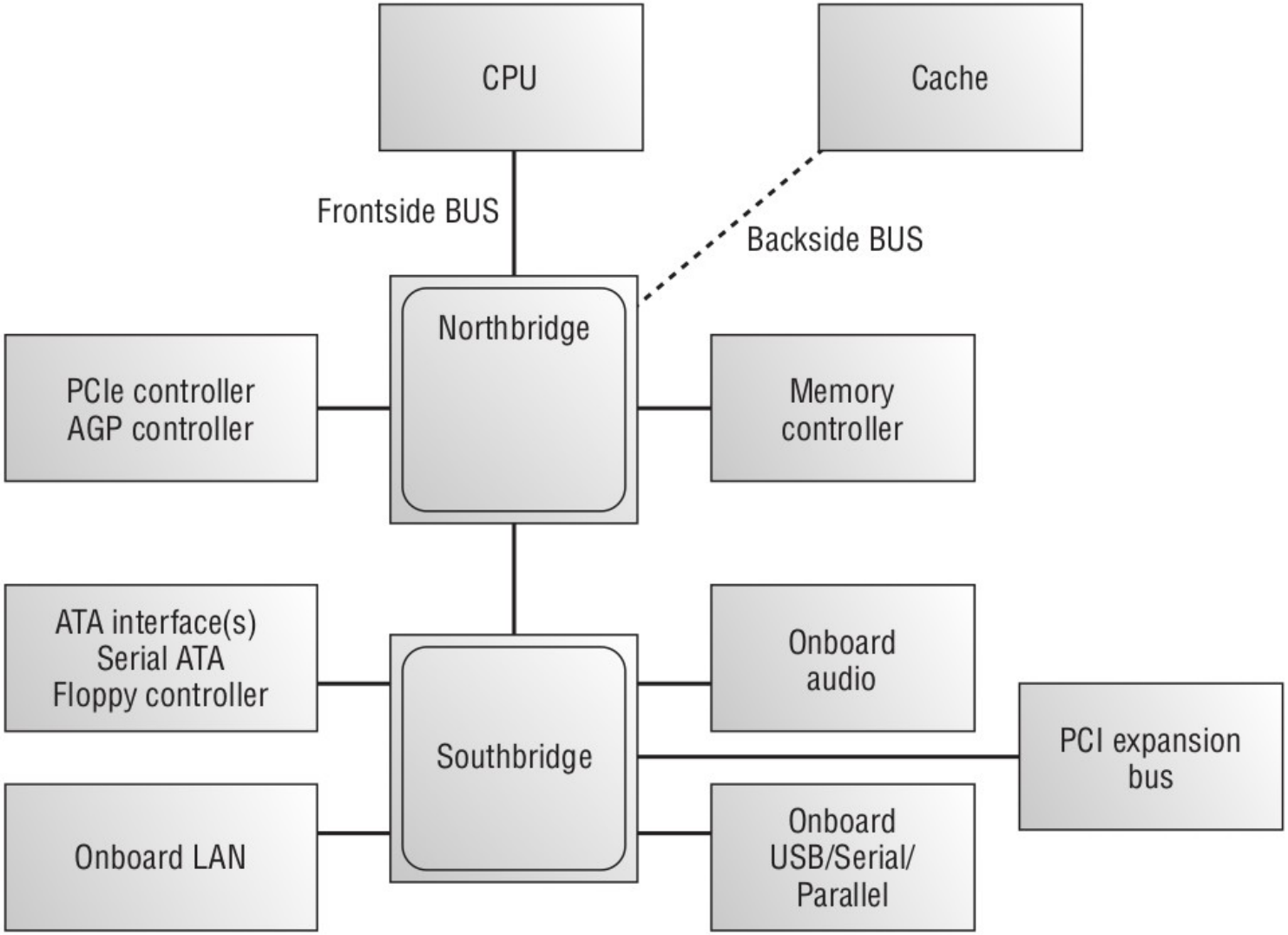
MotherBoard Components

Chipsets

- **Southbridge:**
  - Is responsible for providing support to the onboard slower peripherals (PS/2, parallel ports, serial ports, Serial and Parallel ATA, and so on), managing their communications with the rest of the computer and the resources given to them.
  - if you're considering any component other than the CPU, memory and cache, AGP slots, or PCIe slots, the Southbridge is in charge
  - Some motherboards today as the North Bridge has been moved into the CPU, while the South Bridge has been replaced by the Platform Controller Hub (PCH).
  - The PCH is an Intel chipset that provides similar functionality to South Bridge so manufacturers removed the South Bridge and stuck it with the PCH chip.

XFX
nVIDIA
SLI
play hard.


North Bridge
South Bridge


CPU
Cache
Frontside BUS
Backside BUS
Northbridge
PCIe controller
AGP controller
Memory
controller
ATA interface(s)
Serial ATA
Floppy controller
Southbridge
Onboard
audio
PCI expansion
bus
Onboard LAN
Onboard
USB/Serial/
Parallel

MotherBoard Components

Chipsets

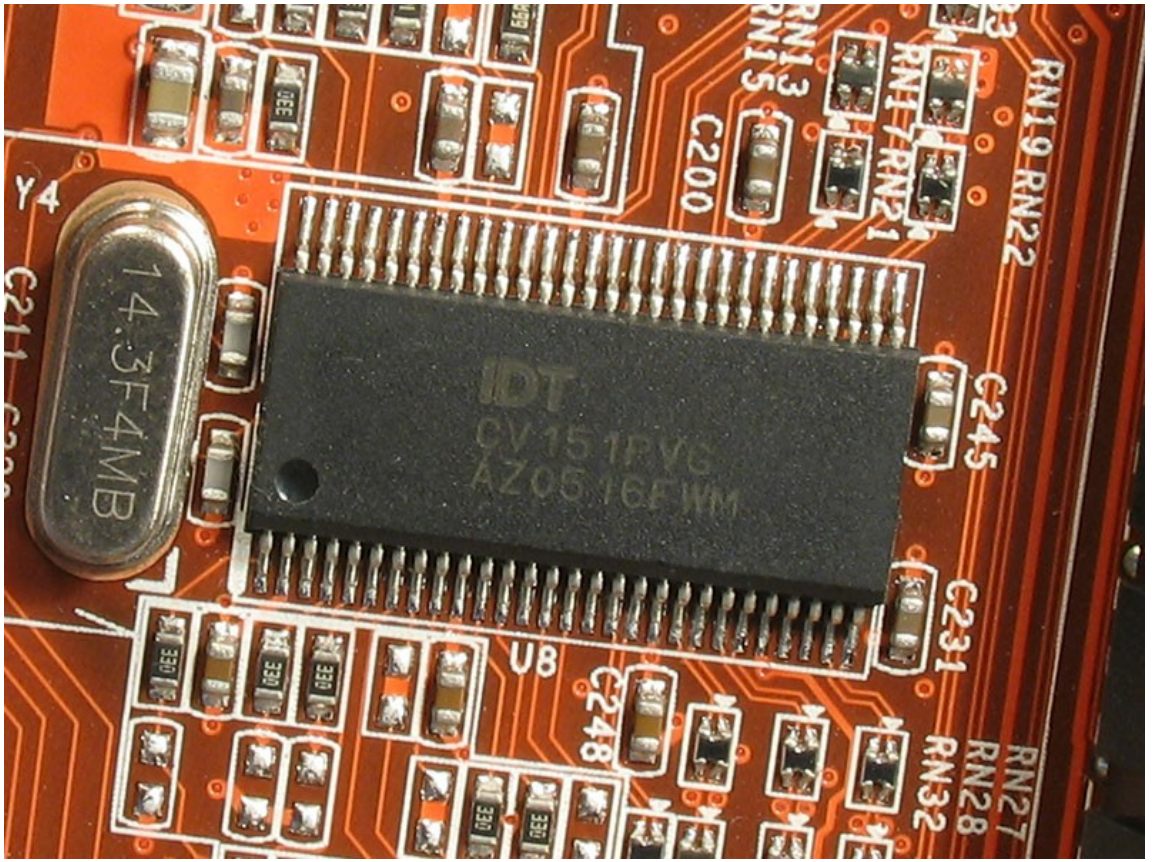
- The communications between the CPU and memory occur over what is known as the frontside bus (FSB).
- Which is just a set of signal pathways connecting the CPU and main memory.
- For instance. The clock signal that drives the FSB is used to drive communications by certain other devices, such as AGP and PCIe slots, making them local-bus technologies.
- The backside bus (BSB), if present, is a set of signal pathways between the CPU and Level 2 or 3 cache memory.
- The BSB uses the same clock signal that drives the FSB. If no backside bus exists, cache is placed on the frontside bus with the CPU and main memory.
- The Northbridge is directly connected to the Southbridge. It controls the Southbridge and helps to manage the communications between the Southbridge and the rest of the computer.

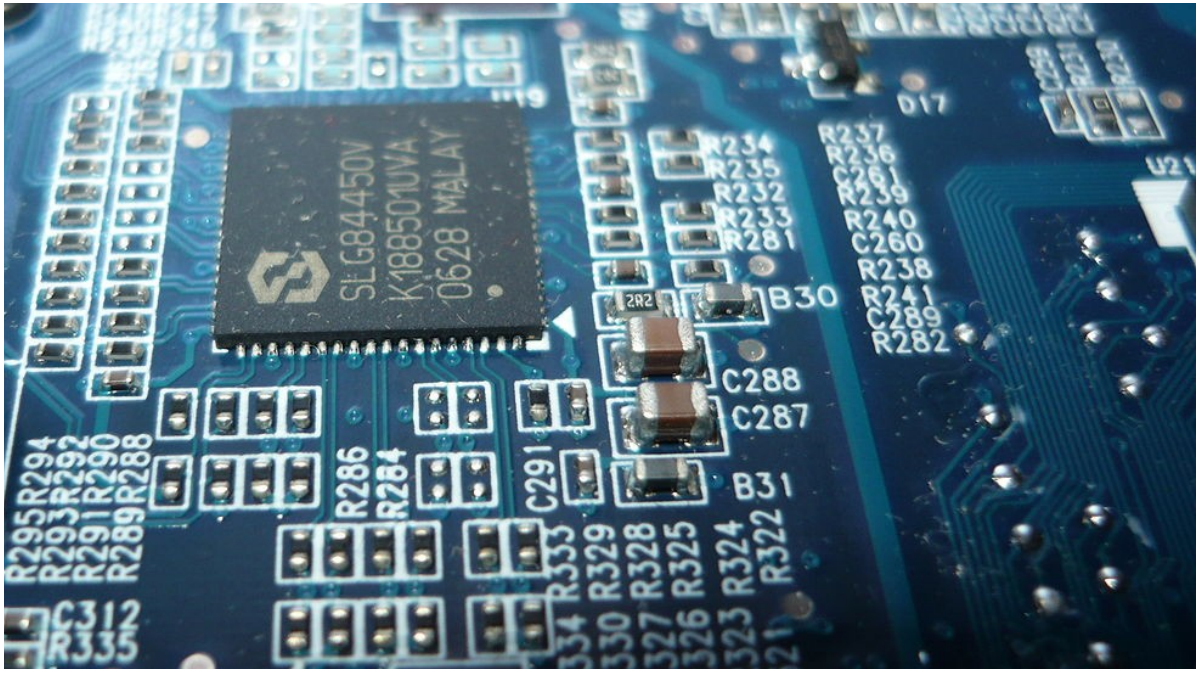
- Clock generator: is an electronic oscillator that produces a timing signal (known as a clock signal) for use in synchronizing a circuit's operation.

- Clock signal: is a particular type of signal that oscillates between a high and a low state and is used to coordinate actions of digital circuits.

- This system is preventing signals from arriving before other signals are ready and thus keeps everything safe and synchronized.

Clock Generator





MotherBoard Components

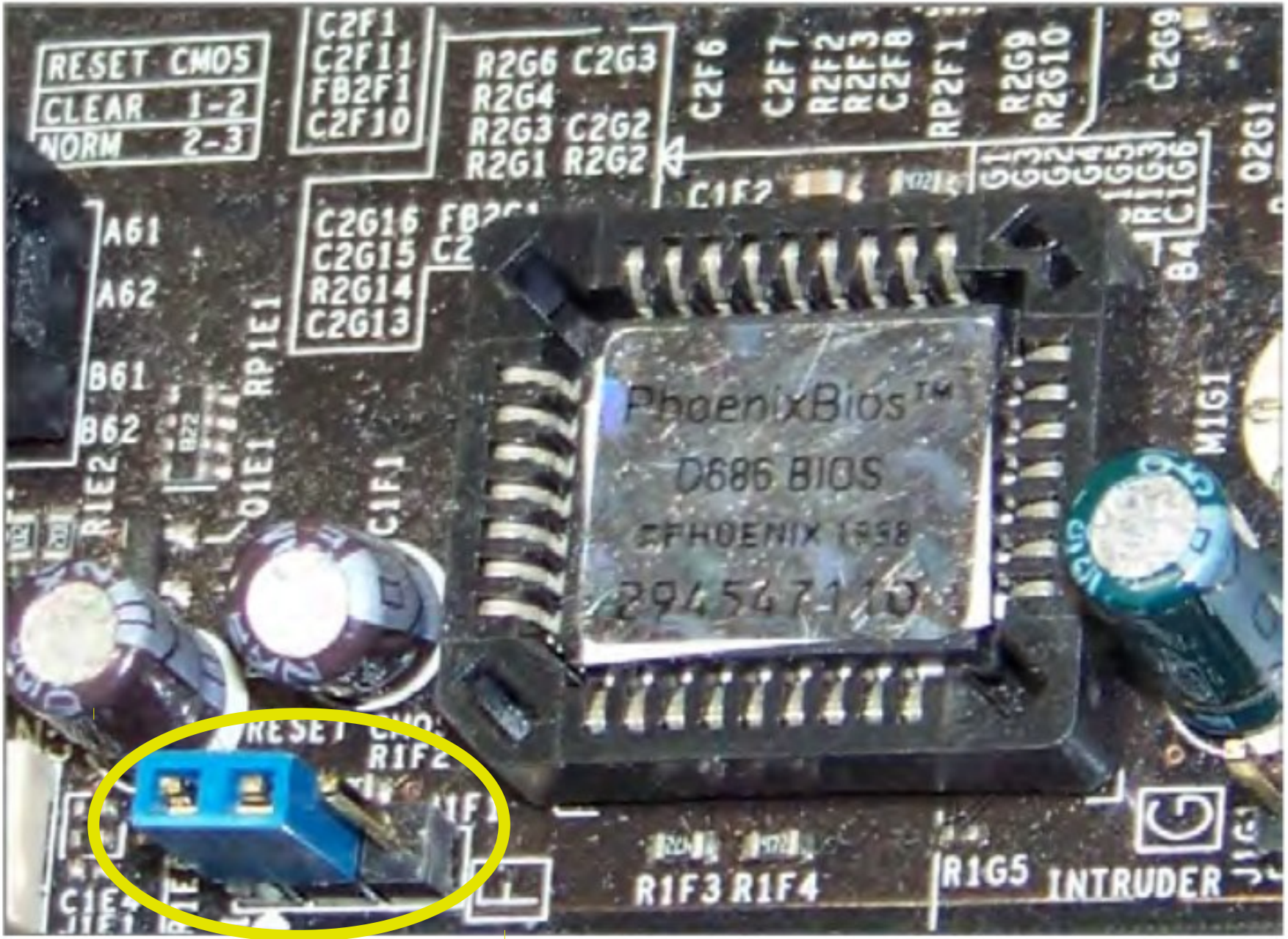
BIOS chip

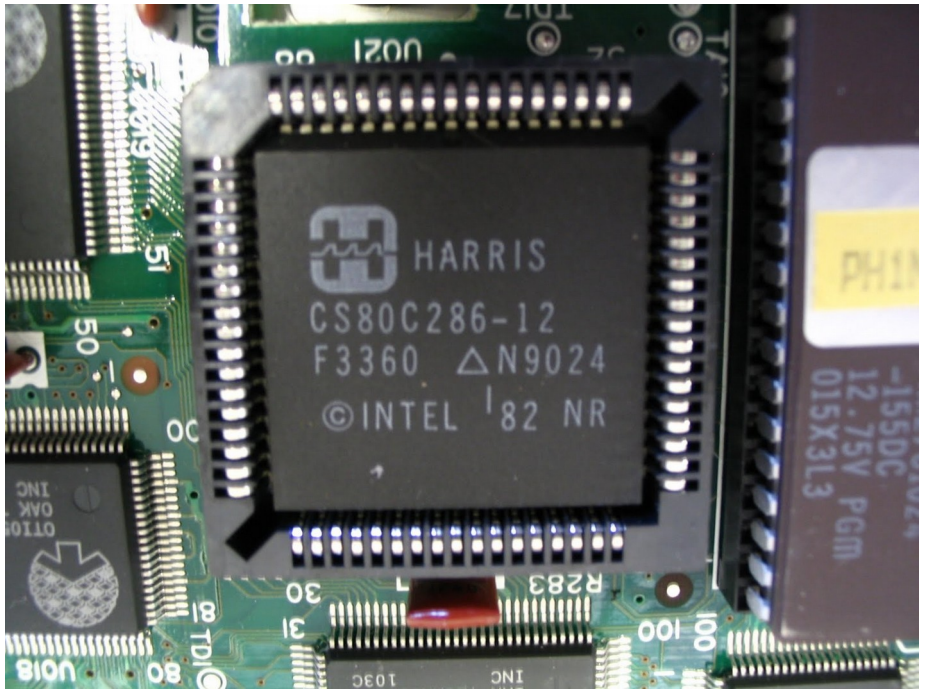
- The basic input-output system (BIOS) is the low-level program code that allows all the system devices to communicate with one another.
- Locating the BIOS chip on older motherboards was easy; it was usually rectangular and generally features a label with the manufacturer's name and the year the chip was manufacture.
- Today's BIOS chips are usually much smaller chips and may not have a label on them, or even be integrated into the Southbridge

MotherBoard Components

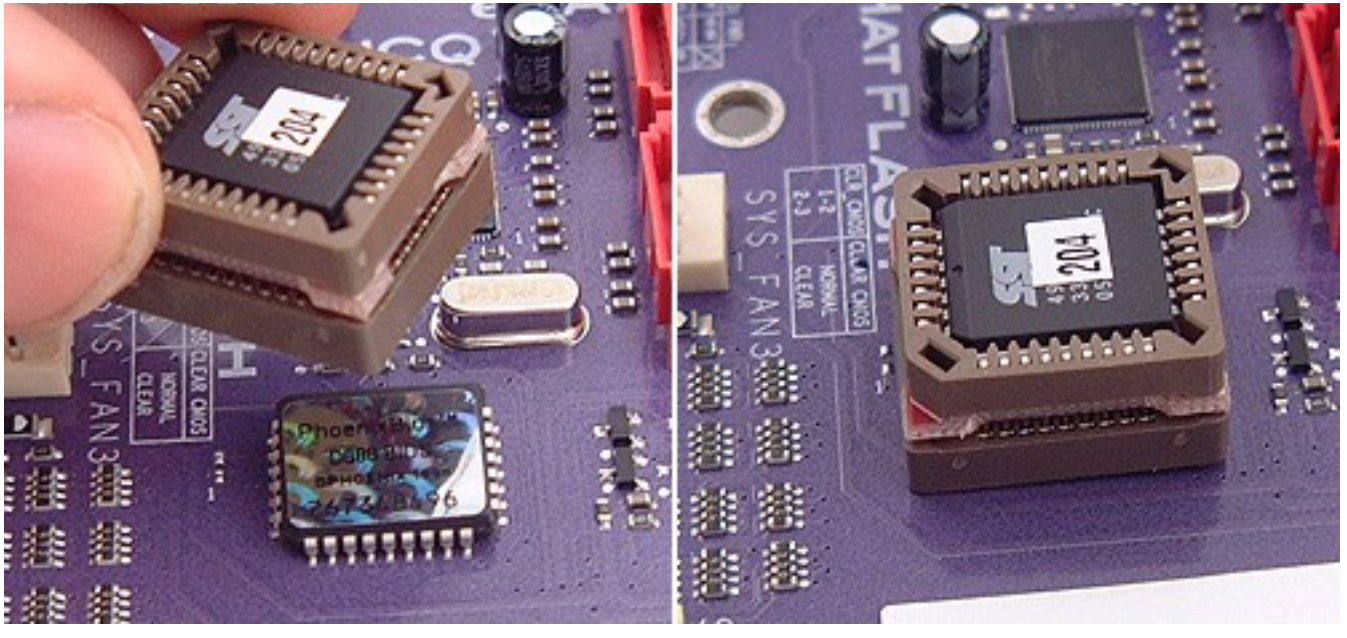
BIOS chip

- The BIOS chip is a read-only memory (ROM) chip, which means that you can read information from the chip, but you can’t write.
- Today’s implementations of BIOS chips are EEPROM (electrically erasable programmable ROM), which means that you can get special software from the manufacturer of the BIOS to write to the chip


RESET CMOS
CLEAR 1-2
NORM 2-3
C2F1
C2F11
FB2F1
C2F10
R2G6 C2G3
R2G4
R2G3 C2G2
R2G1 R2G2
C2F6
C2F7
R2F2
R2F3
C2F8
RP2F1
R2G9
R2G10
C2G9
A61
A62
B61
B62
C2G16
C2G15
R2G14
C2G13
RP1E1
R1E2
C1F1
PhoenixBios™
D686 BIOS
©PHOENIX 1998
RESET
R1F2
R1F3 R1F4
R1G5
INTRUDER


HARRIS
CS80C286-12
F3360 △N9024
©INTEL '82 NR


CMOS
BACH REV A


CLEAR CMOS
NORMAL
CLEAR
SYS_FAN3


K025G

MotherBoard Components

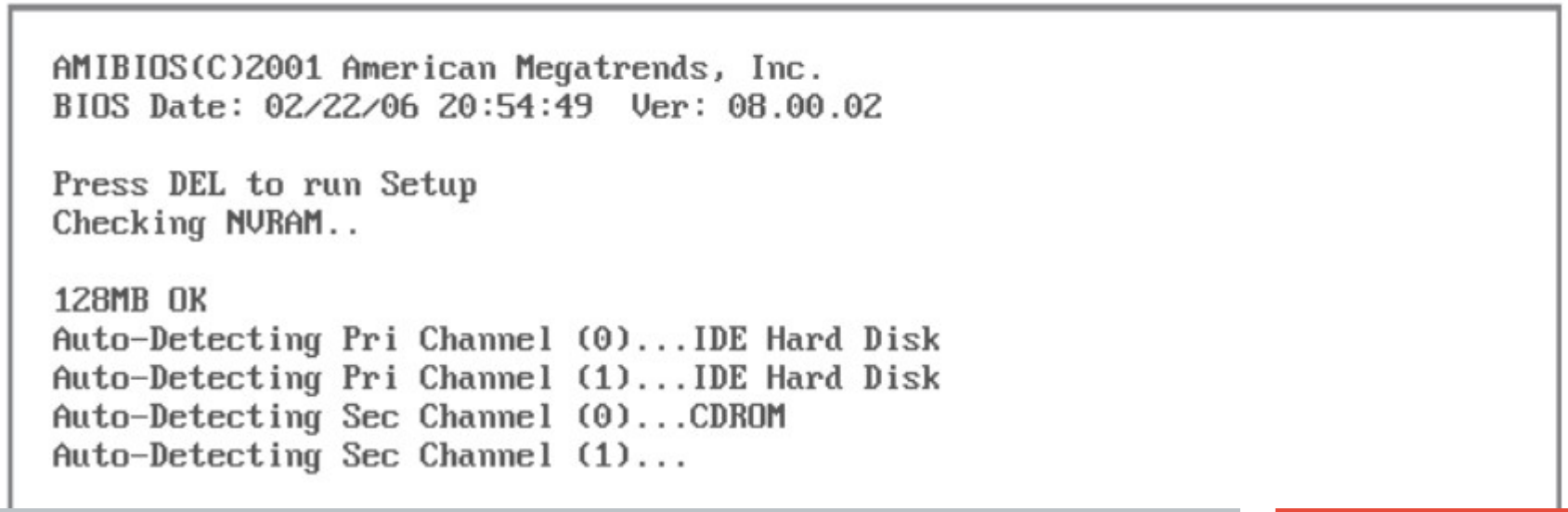
BIOS chip

- Why would you want to erase the BIOS?
  - for example, that your BIOS is programmed to support a hard disk up to 200GB in size, but that you want to install a new, larger hard disk instead
- Contains code that controls the boot process for your system. It contains code that will perform a **Power-on Self-Test (POST)**,
- Which means that the computer goes through a number of tests, checking itself out and making sure that it is okay.

MotherBoard Components

BIOS chip

- After passing the test, the BIOS then locates a bootable partition and calls on the master boot record, which loads an operating system
- The POST process can end with a beep code or displayed code that indicates the issue discovered. Each BIOS publisher has its own series of codes that can be generated.



MotherBoard Components

BIOS chip

- Some BIOS firmware can monitor the status of a contact on the motherboard for intrusion detection. If the feature in the BIOS is enabled and the sensor on the chassis is connected to the contact on the motherboard, the removal of the cover will be detected and logged by the BIOS.

MotherBoard Components

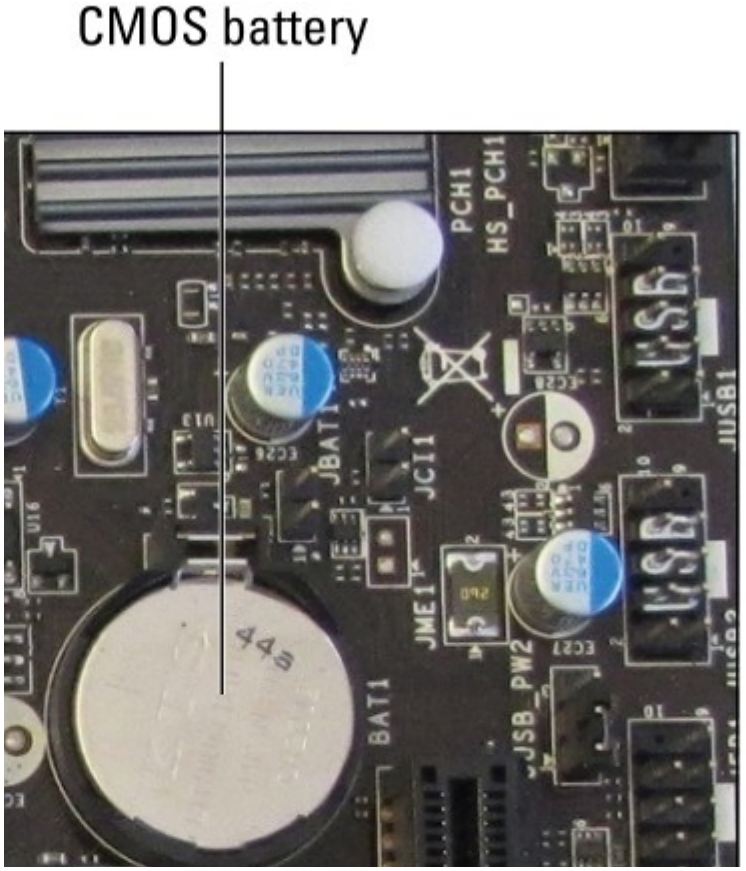
CMOS memory

- The computer keeps track of its inventory in what is known as the complementary metal-oxide semiconductor (CMOS) (usually pronounced see-moss)
  - Date and Time
  - Hard drive/optical drive configuration
  - Memory
  - CPU settings, such as overclocking
  - Integrated ports (settings as well as enable/disable)
  - Boot sequence
  - Power management
  - Virtualization support
  - Security (passwords)

MotherBoard Components

CMOS Battery

To prevent CMOS from losing its rather important information, motherboard manufacturers include a small battery called the CMOS battery to power the CMOS memory.



Thanks For Attention